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Music: A Tool for Expressive and Receptive Vocabulary for Children Who
Are Deaf or Hard of Hearing

by

Lauren Smith

A project submitted in partial fulfillment of the requirements for the degree of

MASTER OF EDUCATION

In

Communicative Disorders and Deaf Education

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Children with congenital hearing loss are at risk for speech, language, and academic delays. Early identification of hearing loss provides the opportunity for children who are deaf or hard of hearing (DHH) to obtain appropriate technology, such as hearing aids or cochlear implants, and to receive early intervention services to optimize development of listening and spoken language. Almost all industrialized countries have adopted policies for universal newborn hearing screening (National Center for Hearing Assessment and Management, 2011). This has significantly reduced the average age of identification from 2 ½ -3 years of age to 2-3 months of age (White, Forsman, Eichwald, & Muñoz, 2010; White, 2010). When parents select listening and spoken language as the primary mode of communication for their child, early intervention services typically focus on auditory perception and language acquisition (Greers, Mood, Biedenstein, Brener, & Hayes, 2009). As children enter the preschool setting, deaf educators continue the instructional focus on language development and academic readiness. Vocabulary development is an essential component of language proficiency and was identified as a literacy priority by the National Reading Panel (Report of the national reading panel, 2006). An area of concern for many children who are DHH is the development of vocabulary, both receptively and expressively. Vocabulary is learned by typically developing children through incidental learning. However, this is not as accessible for children who are DHH. The majority of children who are DHH learn vocabulary best through direct instruction (Lederberg & Spencer, 2009).

Music training has been researched as an intervention program for language development for second language learners, language disabilities and typically developing children. Although the types of music instruction have varied from formal instrument

instruction to singing nursery rhymes, language and vocabulary development have been positively impacted (Swaminathan and Gopinath, 2013, Moreno, Bialystok, and Barac, 2011, Legg, 2009). The systematic use of music, as an instructional strategy for enhancing vocabulary development, for children who are DHH has not been widely studied. Using music elements to support and enhance vocabulary instruction in the classroom may similarly improve the receptive and expressive vocabulary learned within the theme for children who are deaf or hard of hearing. To further explore the potential benefits of using music to enhance vocabulary development in young children who are DHH, this project explored the following objectives:

1. Impacts of hearing loss on language and listening.
2. Vocabulary development
3. Music for learning and listening
4. A proposed music intervention study for children who are DHH.

Impact of Hearing Loss on Language and Listening

Language develops throughout life, but the most growth occurs between birth and 8 years of age (Uylings, 2006) During this critical learning period, children refine their language skills and rapidly gain new vocabulary. The most rapid growth occurs in the toddler and preschool years (Turnbull & Justice, 2011). Children refine their knowledge of language by listening to the language all around them. This makes listening skills vital for children to be able to improve their communication (Cole & Flexer, 2011). This pattern of listening begins early on. Each child with typically developing hearing has around 20 weeks of listening experience before they are even born (Cole & Flexer, 2011). This means that children who are DHH have already missed significant listening

experiences by the time they receive a newborn hearing screening. If listening and spoken language are chosen as the mode of communication, children who are deaf or hard of hearing (DHH) need access to sound. This access to sound can come through use of hearing aids, cochlear implants, or other hearing devices. Access to sound is critical for children to develop vocabulary skills, mean length of utterance (MLU), and grammatical morphemes. This means that children who are DHH may be behind their typically developing peers (NCHAM, 2011 & Stiles, McGregor, Bentler, 2012).

Technology and Advancement

Technology. Historically, children who are DHH have lacked sufficient access to sound needed to acquire spoken language. Limited access to sound and late identification of hearing loss made it difficult for many children with profound hearing loss to acquire spoken language (Blish, 1964, NCHAM, 2011). Since the late 1990's, cochlear implant and digital hearing aid technology has substantially improved, resulting in greater acoustic access to speech. Increased range of amplification of speech sounds provides a greater range of listening input required for children to learn language (Garud & Rappa, 1994).

Early Intervention. However, access to sound is just the beginning. The early years are pivotal for learning to listen, identification of hearing loss at a young age is also necessary for children who are DHH to catch up to their typically developing peers. The National Center for Hearing Assessment and Management (2011) reported that before hearing screening was successfully implemented for infants at the hospital, the average age of identification of hearing loss in the United States was about two years old. Children with mild hearing losses were sometimes not identified until they entered school.

The National Center for Hearing Assessment and Management was created to promote newborn hearing screenings. The objective was to identify all children who are DHH by three months of age, and provide them with appropriate intervention by six months of age (National Center for Hearing Assessment and Management, 2011). According to the National Center for Hearing Assessment and Management (2011), “Almost all industrialized countries have adopted policies for universal neonatal hearing screening.” This has been instrumental in the attempt to realize the National Center for Hearing Assessment and Management.

Vocabulary Development

These goals allow children who are DHH to meet developmental milestones earlier. Children develop vocabulary on a continuum. First, they must understand vocabulary (receptive language), then they can begin using the vocabulary (expressive language), thus developing a comprehension and expression of more complex language. Skills with complex language are essential for school. If vocabulary development is below average, the child’s readiness for school may be affected as well (Greers, Moog, Biedenstein, Brenner, & Hayes, 2009, Turnbull & Justice, 2012).

Historically, children who are DHH had significantly smaller expressive and receptive lexicons in comparison to their typically developing peers (Lederberg, Schick, Spencer, 2013). With the advent of early identification of hearing loss and improved hearing technology children who are DHH may be on target compared to their hearing age, but when compared to their typically developing peers, a gap still exists (Stiles, McGregor, & Bentler, 2012; Fagan & Pisoni, 2010; Lederberg & Spencer, 2009; Lederberg, Schick, & Spencer, 2013). Greers, Moog, Biedenstein, Brenner, & Hayes

(2009) studied language outcomes for children who received cochlear implants in comparison to their typically developing peers. They found that the younger the age of implantation the smaller the gap between the children and their peers. When children who are deaf or hard of hearing (DHH) utilize technology, such as cochlear implants or hearing aids, they have the ability to hear, but they have to learn to listen. Listening is the ability to understand which acoustic signals carry meaning. Children with typical hearing generally develop language through observation and indirect learning; however, children who are DHH are more successful learning vocabulary when they receive direct instruction (Cole & Flexer, 2011, Lederberg & Spencer, 2009). This may account for the gap that may occur between children who are DHH and their typically developing peers. Children using cochlear implants are more prepared for school than their historical counterparts; however, they may need specialized direct instruction in order to catch up in areas of complex language and comprehension (Greers, Moog, Biedenstein, Brenner, & Hayes 2009, Lederberg & Spencer, 2009).

Music for Learning and Listening

Linguistic and music intelligences are two of the ways Howard Gardner (2006) said that people could learn. The different types of intelligences work together like a series of computers. This means that strengthening one area may strengthen the process of learning as a whole. For example, teaching musical skill may improve linguistic skills. Musical intelligence consists of understanding pitch, rhythm, and sound. It is particularly important for children who are DHH to develop musical intelligence because they do not have the same background in learning, processing, and remembering information they get from sound (Abdi et al., 2001).

Yucel, Sennaroglu, and Belgin (2009) studied the auditory discrimination skills of children with cochlear implants. The intervention group received music training for discriminating musical pitch and rhythm. Following intervention, the children who received music training performed significantly better than their peers on auditory discrimination tasks. The music skills trained group remained ahead of the control group in every listening and spoken language measure during the two years of the study (Yucel et al., 2009). The musical skill improved linguistic skills.

Music training for children with cochlear implants increases effective listening behavior. Abdi, Khaleesi, Khorsandi, and Gholami (2001) taught simple folk songs and allowed students in their study to experiment with sounds in music. They found that the students in the case study showed increased habilitation rates following their study. Although this study did not have a group to act as a control, the researchers still believed that children gained important skills because they were being taught how to listen more effectively (Abdi et. al, 2001). Listening more effectively is vital for language development.

Music and Vocabulary

As children learn to listen more effectively, their knowledge and use of vocabulary can increase. Swaminathan and Gopinath (2013) tested typically developing children on measures of comprehension and vocabulary. Children in this study were taught a second language. Some of the children had been receiving music training prior to the study. Those children scored significantly higher in the new vocabulary from the second language than the children who had no musical training. Music training can increase a child's ability to understand vocabulary.

This is also true for children with disabilities. Seeman (2009) found that children who were at-risk for language delay showed a significant increase in receptive vocabulary skills from pre-test to post test following a music intervention. Teachers of the students reported that the children showed an increase in vocabulary, rhyming, and communication skills following the study.

“Music attaches the student to vocabulary in ways that rote memorization does not,” (Berman, 2014) Music intervention has improved vocabulary lexicons for second language learners. Legg (2009) and Berman (2014) both studied the effectiveness of using music to teach vocabulary to teenagers learning a foreign language. The students retained more of the vocabulary when it was paired with music. The music included the vocabulary targets and was taught during class time. Placing vocabulary targets within music taught to the class can also be effective with younger students. Kouri and Winn (2006) used music that included target vocabulary with preschool aged students. The students were presented with both spoken and sung story scripts. Both scripts included target vocabulary; however, the students used the vocabulary without prompting more often following the sung stories. Although these preschool students had language and learning disabilities, they obtained vocabulary knowledge from listening to songs (Kouri & Winn, 2006).

Methods

The research project was a six-week experimental time-series study to evaluate 1) the impact on expressive and receptive vocabulary in young children who are DHH when music is purposefully embedded as part of the instructional preschool curriculum and 2) teacher perceptions of using music for instructional purposes.

Participants

Participants recruited for this study were children who are DHH, aged 3-4 years old, who used hearing technology (e.g., cochlear implants, hearing aids) and whose primary mode of communication was listening and spoken language. A teacher in the Sound Beginnings LSL deaf education preschool program, located on the USU campus, implemented the study in her classroom. The class had six children in the class. Parents of children in the class were informed of the study and consent was obtained for all study participants

Study Procedures

1. The teacher identified her classroom themes over a six-week period, beginning in mid January 2015. Ten associated target vocabulary words were identified from each theme.
2. Expressive and receptive vocabulary tests were developed using the identified target vocabulary words. The vocabulary assessment prompts were developed using pictures to depict each vocabulary word and were administered following the same protocols as standard vocabulary assessments. For example:
 - a. Expressive vocabulary assessment: The child was shown one picture at a time and asked, “What is this?” The child’s response (including a possible no-response) was indicated on the test response sheet. The order of pictures was the same for both the pre-test and the post-test, and across participants.
 - b. Receptive vocabulary assessment: The child was shown four pictures at a time and asked “Show me the ____”. The child responded by pointing to

a picture. The child's response (including a possible no-response) was indicated on the test response sheet. The order of pictures was the same for both the pre-test and the post-test, and across participants.

3. Parents were informed of the study and signed consents were obtained for their child to participate in the pre- and post- vocabulary assessments. All children participated in the music activities, as they were embedded within natural instruction within the school day and did not constitute a deviation from appropriate preschool instructional activities.
4. Expressive and receptive vocabulary pre-tests were administered each Monday morning, with post-tests administered at the end of each week on Thursday afternoon (see Table 1). Order of test administration remained constant across all participants and for both pre-test and post-test procedures.
5. During weeks 1, 3, and 5, the teachers followed their typical curriculum and routines for vocabulary instruction throughout the week. Other than collecting the vocabulary pre- and post-tests, no other study activities occurred during these weeks.
6. During weeks 2, 4, and 6, teachers implemented specific music enhancements within the curriculum to teach and reinforce target vocabulary. Novel songs using target vocabulary words were created to the tunes of familiar songs.
7. Music enhancements consisted of the following song elements each week:
 - a. Literacy book enhanced by use of instruments. Children were given a character or emotion to listen for in the literacy book. When they heard the target words they could play their instrument.

- b. Novel song paired with manipulatives. Students were able to sing the novel song while manipulating pictures that represented target vocabulary.

Example:

Open up the story
To see what we will find
Sloppy, sloppy,
Sloppy eaters here.

Open up the story
To see what we will find.
Delicious, Delicious,
Delicious cookies

Open up the story
To see what we will find.

Loudly, Loudly,
The music plays

Open up the story
To see what we will find.
Pushing, shoving,
She ransacks the room.

Open up the story
To see what we will find.
No more, no more,
She is disappointed.

Target Vocabulary: Sloppy, Delicious, Loudly, Ransack, Disappoint

- c. Two novel songs paired with actions. These songs were used to allow students to get their wiggles out or to transition from one activity to the next. The actions paired with the song represented vocabulary targets or concepts in the song.

Examples:

Wiggle Song:

Tune: Row, Row, Row Your Boat

Eat, eat, eat your food,
in a sloppy way.
Get it all over the room,
Then wipe the mess away.

Climb, climb, climb on up.
Going up the ladder.
Moving your hands and feet
Going to the roof.

Clap, clap, clap loudly.
Make sure that all can hear.
Clapping loudly is so fun,
When we are at preschool

Look, look, look around
Ransacking the room.
Knock over the furniture,
And make a big old mess.

He, he, he's a boy
Look what he can do.
He can run and he can jump,
All around our room.

She, she, she's a girl
Look what she can do.
She can spin and she can dance,
All around our room.

Target Vocabulary: Ladder, He, She, Sloppy, Loudly, Ransack

Transition song:

Tune: The Wheels on the Bus
Go to the table up the ladder,
Up the ladder, up the ladder
Go to the table up the ladder,
Climb, climb, climb.

Go to the table, pretend to eat,
Pretend to eat, Pretend to eat,
Go to the table, pretend to eat
Mmm, it is delicious.

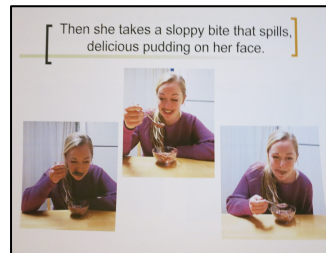
Target Vocabulary: Ladder, Delicious

- d. This novel song was paired with pictures in a novel book. This book was used in the classroom and also sent home with each student.

Example:

Tune: I'm a Little Teapot
Here is goldilocks sneaking into the house.
Inside she finds some pudding in a bowl.
Then she takes a sloppy bite that spills,
Delicious pudding all over her face.

Goldilocks makes a sloppy mess.
Ransacks the house knocking everything over.
Then she climbs the ladder way up high.
Finds a bed and goes to sleep.



Target Vocabulary: Ladder, Author, Illustrator, He, She, Sloppy, Delicious, Loudly, Ransack, Disappoint

Music intervention themes included: Annie and the Wild Animals, Valentine's Day/Bears, and Fractured Goldilocks and the 3 Bears

Data Analysis

Data analysis included both quantitative and qualitative findings. Graphs were used to compare pre- and post-vocabulary test results for intervention and non-intervention weeks. Teacher feedback was obtained in an interview format to allow teachers to express their experiences in using music for instructional purposes.

Results

Vocabulary Data

Pilot study findings indicated a potential trend that when the teacher purposefully embedded music into instruction, students retained more expressive and receptive vocabulary than in control weeks. In the three intervention weeks, students learned an average of 10.6 vocabulary words receptively (see Figure 1) and 14.666 expressively (see Figure 2). In the control weeks, students learned .666 words receptively and 10.333 words expressively.

Teacher Feedback

Interview data and written feedback were obtained from the teachers who implemented the music intervention in their classroom. As shown in Table 2, teachers reported positive findings. The teachers expressed surprise at the sizable difference in vocabulary acquisition from control weeks to intervention weeks. Anecdotally, students were observed singing the songs taught in class during non-instructional times and used vocabulary targets independently without prompting.

Discussion

The study was conducted to explore the potential impact on expressive and receptive vocabulary in young children who are DHH, when music is purposefully

embedded as part of the instructional preschool curriculum. The study also surveyed teacher perceptions on using music for instructional purposes, following study activities.

Study findings indicated positive trends in improvement in vocabulary mastery for expressive and receptive language development when music was purposefully embedded into the curriculum. Anecdotally, in the first week of intervention, it was noted that the children were attentive to the added music element added throughout the day. They enjoyed the music and engaged with the songs and musical activities. In the second and third weeks of intervention, in addition to being engaged, the students began experimenting with using the music themselves. The children attempted to sing along when the songs were first introduced, and learned the words to the songs throughout the week. Some students even sang the songs during post-tests to identify vocabulary.

Objective vocabulary data further demonstrated the potential impact of embedding music into the curriculum. In each of the intervention weeks, the average number of vocabulary words learned was higher than in non-intervention weeks. Study data also showed positive teacher feedback and perspective in purposefully embedding music into the curriculum. Teachers noted that they could see a clear difference in retention of vocabulary through observation and language samples, noted before they became aware of the post-test results. The teachers reported that the music was engaging to students and allowed them to expose their students to more opportunities to use vocabulary without resorting to drilling. Teacher 1 indicated that vocabulary was more easily taught during intervention weeks and she is now cognizant of how easy it would be to implement music activities on her own. The teachers both stated their intention to continue using music as a purposeful part of classroom instruction. A teacher, not

involved in the study, who works with the students in another classroom said: “One day while we were doing a Valentine's activity, Student 5 in the study began singing about Cupid. I was shocked that she knew who Cupid was as we have never discussed it in the afternoon preschool class I teach. I later found out she was learning about it in her morning classroom and remembered it from there!”

These findings are consistent with previous research supporting the use of music to enhance educational outcomes. Children who are DHH often access sound differently than children with typical hearing. However, with advances in hearing technology, their spoken language and access to complex auditory signals, such as music, can provide both enjoyment and positive educational benefits. In education it is necessary to use repetition to develop the brain's ability to use new skills. Purposefully embedding music for instruction can allow teachers to target skills in multiple opportunities for language exposure, vocabulary development, and content exposure while keeping students engaged.

Limitations

A primary study limitation was the small number of participants and the relatively short length of intervention. However, this study provided foundational data in preparation for study continuation. Additional data are needed to provide adequate empirical evidence of vocabulary benefit when music is embedded into the preschool curriculum

Conclusion

Purposefully embedding music in the curriculum to teach vocabulary can increase retention both receptively and expressively. Music is an easy tool for educators to implement, and its effects could extend to other areas as well. Although this was a

small pilot study, it is believed that the positive affect of a music focus in the classroom would continue in a long-term study. It is recommended that a longitudinal study be used to confirm this hypothesis. Other studies may explore the effect of music on other positive aspects of language development as well.

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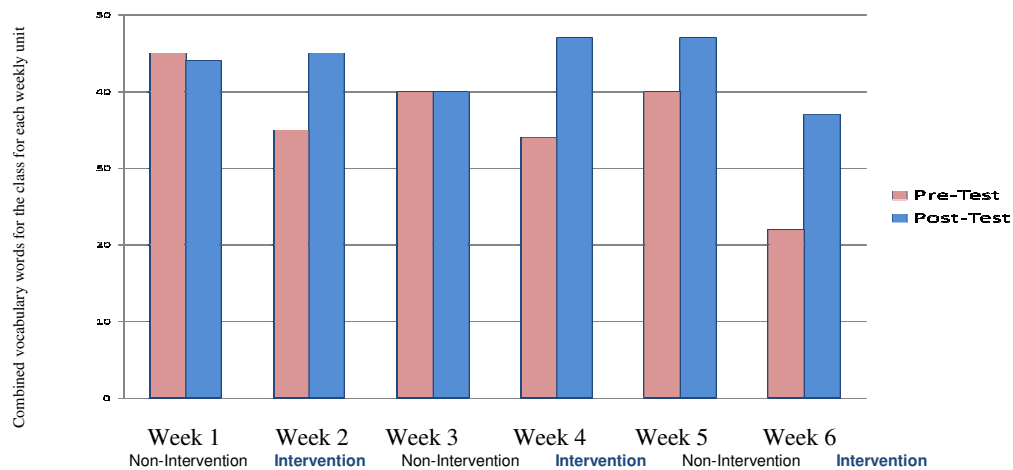
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Table 1. Test Protocol

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Expressive and Receptive Vocabulary -Pre-test	X	X	X	X	X	X
Expressive and Receptive Vocabulary -Post-test	X	X	X	X	X	X
Music intervention materials included in classroom instruction throughout week		X		X		X

Receptive Vocabulary



Expressive Vocabulary

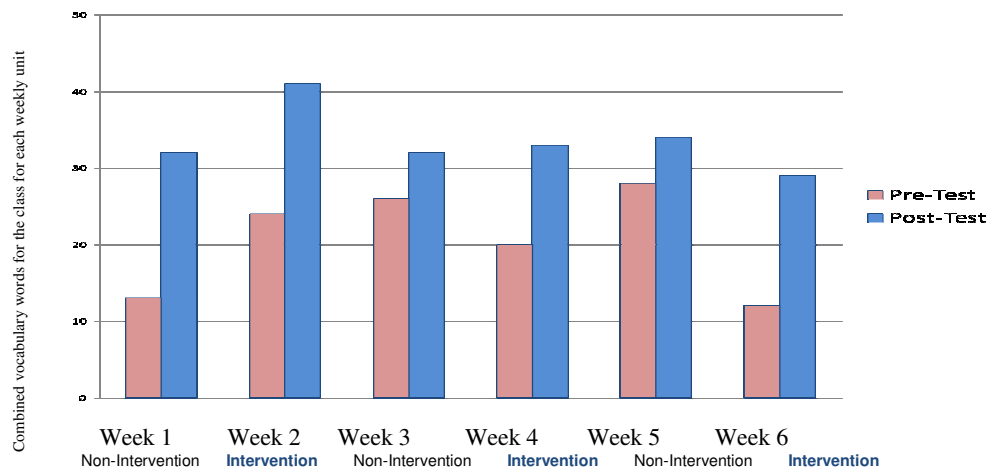


Table 2. Teacher Feedback Interview

Teacher Feedback Interview		
	Teacher 1	Teacher 2
What did you like about the music program?	<p>"I liked that it was really engaging for the students and they enjoyed it. I liked student engagement levels and I saw the difference in their vocabulary acquisition. I also liked your manipulatives, pictures and books, their use brought up engagement level. Not that the study was easy to put together, but I could see how I could easily use music like this now that the study is over."</p>	<p>"It was a fun way to engage the children with vocabulary, more than just drills. It was fun for them to use different modalities, speaking as well seeing, hearing, and moving around. I think it was fun for them too. I also thought it was good that if there was a time where we could use a filler activity, it was easy to pull those activities and songs, and use them to reinforce the vocabulary throughout the morning."</p>
What was difficult about using the music program?	<p>"Sometimes it's hard when someone else writes the songs, because I would sing it in my head before class, but when I sang it in class it wasn't ingrained in my head. But when we collaborated on the songs before class it was really helpful. Also, sometimes it was hard when the meter was off, but I can see how it was difficult to make the vocabulary fit smoothly to the songs. However, once I was familiar with the songs it went smoothly."</p>	<p>"There were some times when Leia didn't know how to put the test to the music. But that's the only thing I could say. In a way the pretest and post test were a time crunch. But I don't necessarily think that would be a difficulty moving on. It just would be a coordination issue. The other difficulty is finding targets for everybody in the class when you have differing levels of language abilities."</p>
Did you notice any difference between music intervention weeks and control weeks?	<p>"I think so, I would have to check the language samples, but the weeks where we used the music I noticed the students singing the songs on their own, not all of them, just a few, but they were singing the songs independently. They caught on to the songs really</p>	<p>"Obviously the results are showing that there are some big differences. As a matter of fact, my student teacher has decided that she is a going to continue using music. In the past, I have used music to link with the theme in fun and creative ways, but I don't think</p>

	<p>quickly. It kind of seems like the weeks without the music intervention the vocabulary was harder to teach. And when we read the book I had to spend time introducing the vocabulary. But when we used the music the vocabulary was taught ahead of time.</p> <p>Simplified book reading. Periodically I do vocabulary comprehension checks during book reading. It derailed the book when we had to stop and learn what the vocabulary meant. During the music intervention weeks it was easier to move the book along, because they already had the foundational understanding of a lot of the words from the music.”</p>	<p>we have used music intentionally to focus on vocabulary. So it was very interesting to see that it made a difference to intentionally target vocabulary in that way.”</p>
<p>Were there any elements of the music program that were difficult to use?</p>	<p>“It was really easy to use because it was planned out so well. Sometimes the transition songs were hard because I didn’t have the tunes in my head. So it would have been easier if they were the same as the songs we used during the other times so I could pull them out of my hat and use them in the moment.”</p>	<p>“I think when you and I were trying to figure out how to visually represent some of the words for the testing. Some were more abstract. For the purposes of a study, sometimes it is difficult to know how to measure those.”</p>

Would you use a music program like this?	<p>“Yes, definitely. Actually this week I have been trying to copy some of the things you did because it was so effective. It helped me learn how to implement it and what planning can go in. It was very helpful to me to learn how to do it. I think it takes a bit of practice, but I feel comfortable.”</p>	<p>“Yes, we have started using music, since we saw such positive benefits.”</p>
Any other feedback?	<p>“It was helpful having you come in on the first day of the music intervention weeks, so I could see how you did the songs for the first time.”</p>	<p>“I would just say I thought it was valuable for not only vocabulary words, but sentence structures too. We’ve started using music to expand the grammatical structure of some of our student’s language.”</p>